Issued March 25, 1911.

U. S. DEPARTMENT OF AGRICULTURE.

FARMERS' BULLETIN 432.

HOW A CITY FAMILY MANAGED A FARM.

BY

J. H. ARNOLD,

Scientific Assistant, Office of Farm Management, Bureau of Plant Industry.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1911.

LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Bureau of Plant Industry,
Office of the Chief.
Washington, D. C., January 3, 1911.

Sir: I have the honor to submit herewith a paper entitled "How a City Family Managed a Farm," which has been prepared by Mr. J. H. Arnold, Scientific Assistant in the Office of Farm Management of this Bureau.

This paper deals with the experiences of some city-bred people who have made a decided success in farming, though lacking in knowledge of this pursuit when farming was begun.

I recommend the publication of this manuscript as a Farmers' Bulletin.

Respectfully,

Wm. A. Taylor,
Acting Chief of Bureau.

Hon. James Wilson,
Secretary of Agriculture.

CONTENTS.

	Page.
Introduction	5
Description of the farm	6
Capital and other resources	7
Arrangement of the fields	7
Cropping system	8
Water supply and sewerage	9
Buildings	9
Labor	9
The system of employment	9
Relation between owner and laborer	11
Economical use of labor	11
Family discipline and occupation	11
The housework problem	12
The farm garden	12
The orchard	14
Woodland and permanent pasture	15
Stock	15
Tillage	16
Fertilizers	16
Financial record of the farm	17
Inventories	17
Receipts and expenditures	19
Corn and wheat	20
What the farm has been made to accomplish for the family	21
Social and agricultural problems satisfactorily solved	23
A serious problem	25
Farm implements and their cost	27

ILLUSTRATIONS.

		Page.
FIG. 1.	Plan of the farm, showing the arrangement of the fields, buildings, etc.	7
2.	A convenient wagon shed, economizing time and labor	9
3.	A laborer's house, planned by the owner and built to a great extent by farm labor during the winter of 1909–10	10
4.	Plat of the farm garden, showing the crops grown in 1909	13
5.	A section of the woodland and bluegrass pasture on the farm, showing where the trees have been cut off to get a growth of bluegrass	14
6.	Diagram showing the annual net income from the farm and the annual gross income from wheat and corn	20
7.	The family home, built for comfort and economy of labor in household work	23

B. P. I—638.

HOW A CITY FAMILY MANAGED A FARM.

INTRODUCTION.

This bulletin is a record of the experience of a city family that moved onto a farm in 1892. The father had been a lawyer by profession, the manager for a well-established business firm in one of the principal cities of the Middle West, and was earning a salary of $3,000 a year. At 60 years of age, having been in business about twenty-five years, he was compelled on account of ill health to abandon his profession and business. There were 10 children in the family, ranging from 2 to 21 years of age, of whom 7 were boys.

Under these conditions, with available capital amounting to about $10,000, which had been partly saved in business and partly received by inheritance, the family decided to buy a farm and attempt to solve the problem confronting them, namely, "to make a living, educate the children, and make a pleasant home." This paper will tell how they satisfactorily solved the problem, and while this is not a story of typical farm life, it shows what courage, energy, business ability, and moderate capital may accomplish on a farm. The fact that this farmer has been successful without previous experience or special training, following systematically the ordinary cropping system and methods of tillage, with the exercise of good judgment, shows that the chances for success in farming are as good as in most business enterprises.

An attempt will be made to present such facts about this farm as will enable the reader to comprehend under what conditions and by what means the results were accomplished; hence, a description of the farm and the methods of operating it will be given in some detail. It is not intended to indicate in this description ideal methods of farming. As a model of farm management from the standpoint of maintaining soil fertility and thus obtaining large crop yields this bulletin will have no special interest. The methods of keeping accounts suggested in the tables have been the instruments through which this farmer has kept track of his business, but they are not given as model forms. The description given is rather for the purpose of enabling the reader to get the point of view and spirit of the

family in meeting the problems of life and realizing their ideals on a farm.

It is believed that this farmer has, by his experience, answered the chief objections to farming as an occupation and to a farm as a place for establishing an ideal home. These objections, as usually stated, are that farming is not as remunerative as other occupations for the same ability and effort expended, that the family is deprived of desirable educational and social opportunities, and that the labor is too hard and uninspiring, especially for the women. The record will also show how some important social, economic, and technical farm problems have been worked out; for instance, the farm-labor problem, the household problem, the training of children in responsibility in management, and the doing of farm work in a way to meet the requirements of a normal social life and of cultivated intellectual tastes. It is also believed that a narrative of American farm life, such as this, will demonstrate not only the possibilities but the desirability and dignity of farming as an occupation.

While the owner of the farm wishes to avoid publicity, he is willing that the results of his experience be made known in order that other city men may feel safe in attempting to support and educate their families in this manner.

A diary and a financial record were kept on this farm for a period of seventeen years. The facts here given are based upon these records.

DESCRIPTION OF THE FARM.

When the family began country life in 1892 the farm consisted of 300 acres[a] in a much run-down condition. It was an old farm, having been located and surveyed about the middle of the eighteenth century. The old house, which had been built about 100 years ago, was still substantial. In a remodeled form it is now the kitchen of a modern house. Much of the land had been allowed to grow up in bushes and young trees. The barns and fences were out of repair, so that the place as a whole presented a dilapidated appearance. The farm had been rented out and had produced a gross income of about $700 a year.

The location is in the beautiful and fertile region known as the Shenandoah Valley, the middle section of the great Appalachian Valley which extends from the northeast corner of Pennsylvania to central Alabama. It is about 100 miles from a seaboard city and is accessible to railways leading to New York and to the large cities of the Ohio and Mississippi valleys. In this section there are now

[a] About 80 acres were added to the farm a few years later, making the entire farm consist at present of 380 acres.

good turnpike roads. One of these passes the farm and leads to a shipping point 3 miles distant and to the county town of 3,500 inhabitants, 3½ miles distant.

The soil here is residual, formed from a limestone of the Cambro-Silurian age, having a rich brown color and, according to the classification adopted by the Bureau of Soils of the Department of Agriculture, is a clay loam of the Hagerstown series.

CAPITAL AND OTHER RESOURCES.

The inventory taken January 1, 1892 (see Table I), showed that the land with improvements was valued at $55 an acre, the whole farm and equipment being worth $19,707. The debt on the farm, $8,459, and money borrowed for fertilizer, $220, made the total liabilities $8,679, which, deducted from the above assets, left a balance of $11,028, which constituted the "present worth" of farm and equipment at that date.

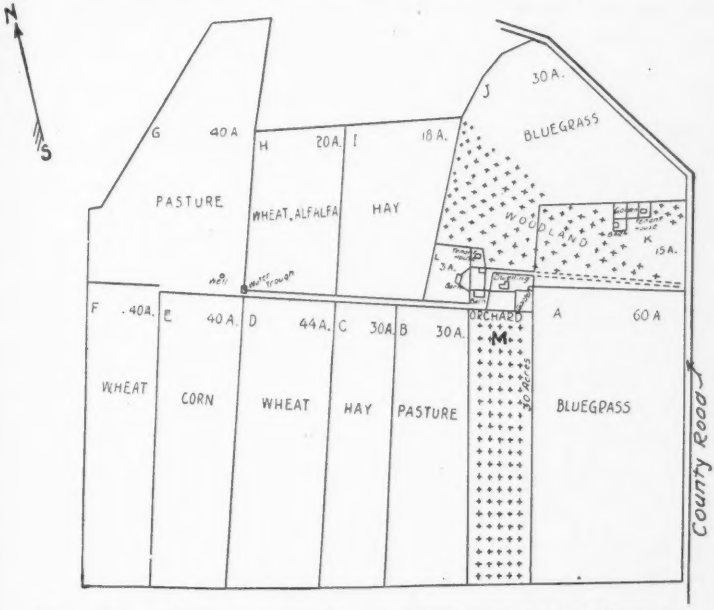

FIG. 1.—Plan of the farm, showing the arrangement of the fields, buildings, etc.

ARRANGEMENT OF THE FIELDS.

The general management of the farm seems to have been well thought out from the first. The farm was laid out originally about as it appears at present, and with slight changes to fit conditions the cropping system was the same as now. The plan of the farm (fig. 1) shows the convenient arrangement of the fields.

Special attention was given to laying out the farm. All the fields except F may be reached within 650 yards of the barnyard. Field F is within half a mile. The fields are as long as can be arranged in accordance with the general farm plan. This is regarded as an important feature in the arrangement, since the time saved during the year in turning corners when plowing and in doing other farm operations is considerable. The gate to each field is placed at the corner nearest the barn, and workmen are required to leave implements at the gate when coming in from the fields. The lane leading to the fields is 30 feet wide; except for the wagon track it is grown up in bluegrass, so there is practically no waste on its account. A well, 80 feet deep, located in field G, supplies water by windmill to a cement trough, which is so placed that it furnishes water in two fields and may be reached easily through the lane from other fields.

CROPPING SYSTEM.

The general crop history of each field may be worked out from the following system of rotation: Corn, wheat, wheat, grass for hay, pasture, corn. Usually two wheat crops follow in succession, and now and then if the stand of grass is not good it is plowed up, put into corn, and reseeded the next year to wheat. On the plat (fig. 1) are shown the crops raised on each field in 1908–9, the plan for the rotation of fields during 1910 being tentatively as follows: B, pasture; C, corn; D, hay; E, wheat; F, wheat; G, pasture; H, wheat; and I, pasture. This will give the following acreage of crops: Wheat, 95 acres; corn, 40 acres; hay, 49 acres, including alfalfa; pasture, 78 acres, besides the permanent pasture.

There are thus 262 acres which have been farmed in the five or six year rotation for nearly seventeen years. During this time the division of crops, which have been run in rotation, has been on the average as follows: Corn, 47 acres; wheat, 80 acres; and hay and pasture, about 135 acres. It is to be added, however, that field M, which is now in orchard, was put in some field crop up to the time the trees were six or seven years old. The bearing orchard, 15 acres, is now 14 years old, and the remainder, 15 acres, is in 1 and 2 year old trees. The young orchard is in corn, making the total acreage of corn 55 acres.

On field H, 5 acres of alfalfa were sown in the fall of 1908. The alfalfa was not able to crowd out weeds, especially the sorrel, which for a time threatened to take the crop. During the spring and summer of 1909 the field was disked twice and harrowed two or three times with a spring-tooth harrow, and in September a heavy coating of lime was applied as a top dressing. On September 23, 1909, the alfalfa was vigorous and the indications were that it would continue to thrive.

WATER SUPPLY AND SEWERAGE.

The barn lots, dwelling, and permanent pasture fields are supplied from a well near the premises. By means of a steam engine the water is lifted into a tank and distributed through pipes where needed. The dwelling is equipped with modern conveniences, such as bathroom, water-closet, lavatories, and hot water. The sewage is distributed through tiles in the orchard. The entire system was planned by the owner and the work was done by labor on the farm.

BUILDINGS.

The buildings have been constructed from the point of view of economy in expense and convenience in use. There are good, substantial horse and cow barns. Their location has been planned in accordance with principles of economy in getting to the fields on the farm. The cow barn and lots are so placed that all the fields may be reached directly. Stock can not interfere with other buildings and premises. Horses may be taken to the fields by opening one gate. The wagon shed (fig. 2) is so constructed that the teams are simply driven through the shed and the wagons left standing in their proper places. No labor and time are consumed in pulling or pushing the wagons into place.

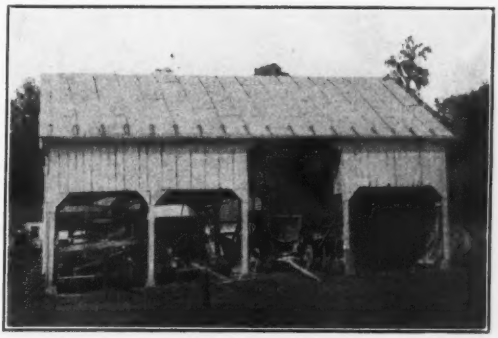

FIG. 2.—A convenient wagon shed, economizing time and labor.

LABOR.

THE SYSTEM OF EMPLOYMENT.

The farm laborers, who are hired by the year, have families, and live in houses built especially for their use. One of these houses is shown in figure 3. Reference to the farm plan will show their location. One acre of ground goes with each of the houses for a family garden. Barn room and the necessary outbuildings for stock belonging to the laborers are also furnished.

The plan of housing laborers in separate quarters is followed, first, to secure privacy and freedom in the home and to relieve the household from extra labor. Second, experience shows that it is possible to secure better service by having men with families. This plan has been followed with but few exceptions from the first and has been quite satisfactory to the family and to the men. As a rule these men have been recruited from factories, railroads, and mines. They are secured by offering inducements not usually given on farms. Ten hours of labor, for instance, is all that is required, and usually a part holiday on Saturday. Sometimes a whole day is given as time off to work their gardens, etc. Any special service or extra good work is rewarded in some way.

The standard money wages paid is $200 a year. In addition a dwelling, 1 acre of garden, one cow and pasture, and firewood are furnished. Remuneration beyond this is dependent upon the quality of service. If satisfactory service has been given during the first year $25 extra is paid in cash and 5 barrels of corn to fatten hogs. After two years of satisfactory service $50 in cash and 10 barrels of corn are given at the end of each year. If wheat is put in satisfactorily and the crop is good, 30 bushels of wheat in the mill is added to the income of the laborer's family. The laborer may keep as many fowls as he chooses, inclosed. He has the same area of garden as his employer's family and may sell as much as he likes from it.

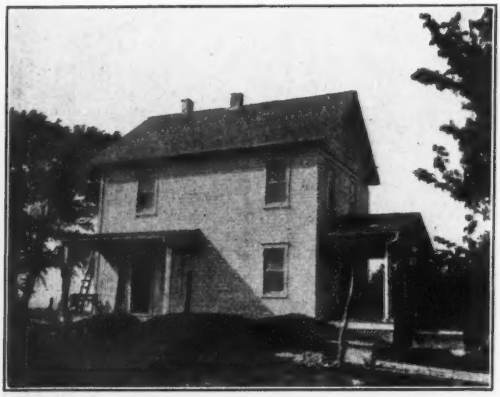

FIG. 3.—A laborer's house, planned by the owner and built to a great extent by farm labor during the winter of 1909–10.

This plan has enabled the majority of the laborers who have lived on this farm to accumulate a sufficient amount of capital to take up farming for themselves. Some have become owners of farms. The employer takes pains to teach his men good farming methods.

At least one of the laborers is expected to have sufficient mechanical ability to do all needed repairing and to help with the construction of buildings on the farm. For this purpose there is a well-equipped blacksmith and carpenter shop. This provides work on rainy days and in the winter.

RELATION BETWEEN OWNER AND LABORER.

The proprietor takes a personal interest in the welfare of the laborer and his family. He holds that good work can not be secured unless the laborer is contented and gives his services cheerfully. Mutual good will develops when the employer is careful in the selection of his men and permits them to share in the general success of the farm. In 1909 the best laborer on the farm, the man longest in service, concluded to begin farming for himself. The employer bought 20 acres of land for him, which will be paid for in small sums, as he can afford to make payments.

ECONOMICAL USE OF LABOR.

The economical use of labor is one of the most serious problems in farming. This farmer has plans drawn for the remodeling of buildings, the changing of fences, and the erection of new buildings. "I make these plans as they come into my mind," he says, "and when labor can not be profitably used in the fields it is employed in carrying out these plans. As a rule, I plan ahead for my farm work and find that it pays, since we lose no time and labor can always be profitably employed."

During the winter of 1909–10 a new tenant house was planned by the owner and largely constructed by the regular farm labor, with such other help as could be obtained in the community. The large barn on the farm was built entirely by the men and boys of the family and two laborers.

FAMILY DISCIPLINE AND OCCUPATION.

The occupations and labor of the family are not arranged from the standpoint of economic results, but in accordance with the principle stated in the introduction—that of properly training the children and making the home pleasant.

In the home the children, from the time they were old enough to perform any service, have been required "to do something for the profit or welfare of the family before having any breakfast." The work done by the family in the house was systematized in such a way that each member when old enough assumed responsibility for some of the work. This system of training is adapted to the requirements of farm life. There have been developed on the farm industries such as dairying, poultry keeping, gardening, orcharding, and general farming. At the present time one son makes the apple orchard his specialty. A daughter is responsible for the poultry and another for the marketing of produce and the bookkeeping. The

mother does the cooking and superintends the dairy. The father superintends the whole farm, sees that crops are properly put in and cultivated, and that the stock is well cared for. He is in touch with every operation on the farm and inspects all the work that is done.

Special attention is given to the care of work horses. Every evening the shoulders of work horses are bathed with cold water. At noon in summer the laborers are given an extra half hour to unharness and reharness the horses. As a result of this special care, sore shoulders on horses are seldom known on this farm.

THE HOUSEWORK PROBLEM.

No regular house servants are kept in the home. The work of housekeeping is done by the mother and two daughters. The laundry work is done outside. All heavy work, and such labor as caring for the garden, etc., is done by the men. The cooking arrangements are planned to economize labor and make it as easy as possible. A hot-water tank is connected with the plumbing system, so that plenty of hot and cold water can be had at any time. This arrangement, combined with a large sink from which waste is carried to the sewer, eliminates most of the conditions which tend to make housework drudgery. Utensils are kept in their proper places, so that they can be reached with the fewest possible steps.

THE FARM GARDEN.

The garden, consisting of about 1 acre of land, is an important feature in the management of this farm. The crops shown on the diagram (fig. 4) are those planted in 1909. Besides the vegetables and small fruits for family use, the garden brings an income of about $200 a year, the products being exchanged for groceries. This pays the expenses of the table. The principal money crops from the garden are kale, spinach, winter onions (sold in early spring), tomatoes, and cantaloupes. Kale and spinach are not common crops in this section and a ready market has always been found for them. Others, however, are beginning to raise kale on their own account, so that more spinach is now being raised on this farm. Prices have ranged from 40 to 60 cents a bushel for kale and 60 to 80 cents a bushel for spinach. From 250 to 300 bushels an acre is considered a good crop. Besides being raised for the market, kale is used as a general winter cover crop in the garden. On September 23, when the writer last visited the farm, kale was coming up in all places not in regular garden crops. It is found that kale plowed under in the spring puts the ground in fine condition for cantaloupes.

A specialty has been made of raising late tomatoes to be put on the market when this fruit is scarce. Tomatoes are sold from this garden about the last of October and in November. Most of the products are sold by telephone to the merchants in the town and villages in the county.

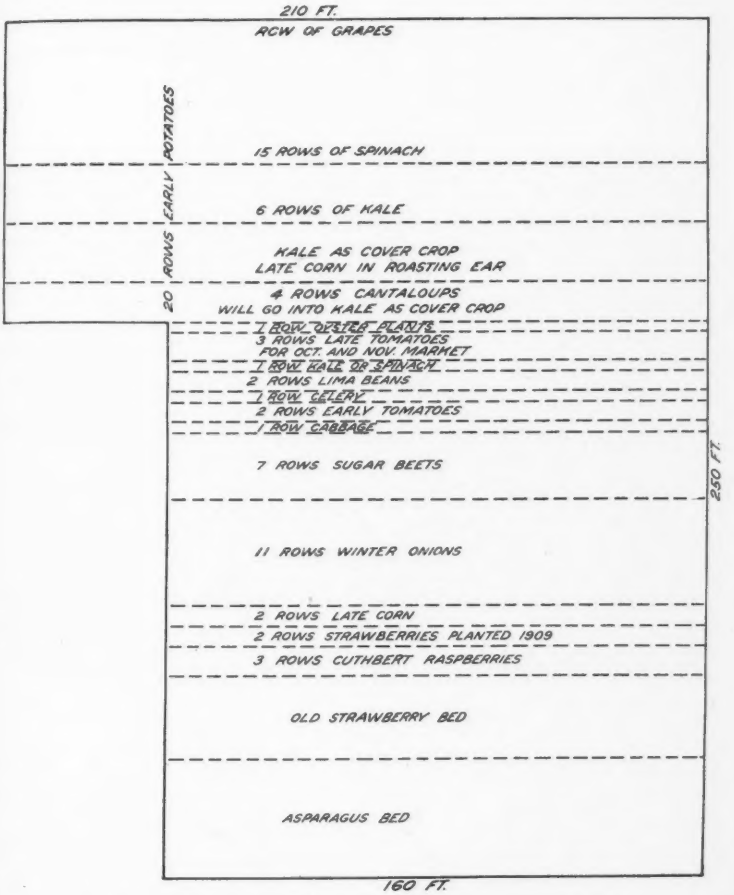

FIG. 4.—Plat of the farm garden, showing the crops grown in 1909.

A row of grapes occupies the space along the fence at one end of the garden. There are also four short rows outside, not marked on the diagram. The vines are trimmed in winter, but receive no other special care. When the fruit is formed in early spring the bunches are bagged with 2-pound grocery bags, tied securely with a string

about the base of the stem. It is stated that these bagged bunches will stay well preserved on the vines until frozen off. The bunches still hanging on the vines unbagged were badly diseased and rotted on September 23.

THE ORCHARD.

Field M (see fig. 1) is now planted in orchard, 15 acres of which is in the bearing stage. With the exception of a few old trees near the house this orchard is 12 to 14 years old. The trees were planted in the ordinary manner about 30 feet apart, cultivated in crops for six to ten years, then seeded to grass and clover. At two different

FIG. 5.—A section of the woodland and bluegrass pasture on the farm, showing where the trees have been cut off to get a growth of bluegrass.

times a bushel of wood ashes was put around each tree. This year manure was hauled between the rows and spread about 10 feet from the trees. Since it has been in grass the orchard has been pastured by sheep and hogs. The branches are thinned out in the dormant season, being trimmed mostly at the top. The trees are sprayed four times a year, twice for the San Jose scale and twice for the codling moth. There is a space of about half an acre with no trees. The orchard had become infested with the San Jose scale and the infested trees were cut out before the proprietor learned how to deal with this pest.

Reference to the table of receipts and expenditures will show that this orchard has been bringing in a substantial income for three years. Last year 800 barrels of apples were marketed at $2.10 a barrel. The varieties grown for market are the Ben Davis and York Imperial. It is planned to increase the size of the orchard until it reaches about 100 acres.

WOODLAND AND PERMANENT PASTURE.

About 30 acres of the farm in one tract is in forest, containing many large and valuable oak, hickory, elm, and walnut trees. The field marked "K," in which are many of these trees, is known as "The Refuge." Squirrels play without fear in this field. Where the trees have been thinned out in the woodland, bluegrass has come up luxuriantly (fig. 5), so that the greater part of fields A, J, and K furnish fine pasture in the early spring.

STOCK.

In the inventory of January 1, 1905, 182 head of live stock were recorded, and on January 1, 1909, there were 200. Averaged for the past five years the proportion of different kinds of live stock is about as follows: Horses, 10; cows and stock cattle, 40; young cattle, 10; hogs, 35; and sheep, about 100. On the average about 160 acres remain in pasture. To show that this farm has about the right area in pasture, the following estimate of pasture area for each class of stock is given:

40 cows and stock cattle	80 acres.[a]
10 young cattle	15 acres.
35 hogs	10 acres.
100 sheep	40 acres.
10 horses and colts	15 acres.
	160 acres.

The dairy department of the farm maintains on the average 8 to 10 cows. Butter is made and sold in the local markets. It is found to be more profitable to buy young steers and keep them a year than to buy and feed the same year.

Sheep have always been kept on the farm and the profit in them is very satisfactory.

Ten horses and 2 or 3 colts are kept on the place. Seven horses are used for farm work and 3 for driving.

[a] These figures should be studied in connection with the statistics presented in "Cropping Systems for Stock Farms," by W. J. Spillman, Yearbook of Department of Agriculture for 1907.

TILLAGE.

Three-horse plows are run from 9 to 10 inches deep for both corn and wheat. No guessing is allowed on this point, since the furrows are measured frequently to see that the required depth is maintained.

The ground for wheat is prepared in the following manner: As soon after harvest as possible the stubble ground is plowed. It is harrowed, then rolled and harrowed again, the second time with a spike-tooth harrow. A spring-tooth harrow precedes the drill. The wheat is sowed about September 25. Wheat to follow corn is put in as soon as possible after the corn is cut, the land being prepared by running a disk harrow over the field and then a spring-tooth harrow. Sometimes the spring-tooth harrow alone is deemed sufficient. The land is then drilled the same as the plowed ground.

Corn is planted on land which has been in pasture. Before plowing the ground is covered with stable manure. After plowing it is pulverized with a disk harrow and cross-harrowed before the planter. It is harrowed once after planting and then cultivated with two-horse cultivators, the last time or two very shallow.

FERTILIZERS.

The manure spreader is regarded as one of the most important implements on the farm. By means of it, it has been possible during the past few years to cover about 75 acres of the farm each year with stable manure.

It is a common practice in this section to use commercial fertilizers when sowing wheat and grass. The fertilizer is mixed on the farm. It consists of a mixture of one half of ground raw bone, containing 22 per cent of phosphoric acid and 2½ per cent of nitrogen, and one half of South Carolina ground rock, containing 16 per cent of phosphoric acid. It has not been the practice on the farm to plow under green crops, although the benefit of such practice is recognized. A straw mulch has been put on part of a field at different times and plowed under. The results have been good. One year the plowing under of straw alongside of land well manured gave about the same results as manured land. In the year 1909 on field D, a part of the wheat stubble was mowed soon after harvest to serve as a mulch. On the ground that was mowed the clover was taller and more vigorous on September 2. The difference was to be seen also on September 23. The year 1909 being very dry, this covering no doubt prevented the evaporation of moisture and thus aided the clover in making a better growth.

FINANCIAL RECORD OF THE FARM.

INVENTORIES.

A simple but quite complete record of results on this farm has been kept from the time the farm was purchased until the present time. This is in the form of a diary and a bookkeeping record. On January 1 of each year an inventory was made. Tables I, II, and III show inventories for the years 1892, 1905, and 1909, which give a good idea of the development of the farm and particularly of the increase in its value. Under the heading "Plant" are given the real estate and the live stock and machinery which are used in operating the farm. Under the heading "Materials and supplies" are given feed and salable grain and animal products; also live stock which may be sold or used to replace older stock for breeding and dairy purposes.

In 1892 the value of the plant was $18,167; in 1905 it was $32,365; in 1909 it amounted to $41,972. It will be seen that the value of the plant has more than doubled during the seventeen-year period. The net income has more than doubled also, so that the increased valuation of the real estate could properly be based on the income.

TABLE I.—*Inventory of the farm, January 1, 1892.*

Item.	Value.	Total.
ASSETS.[a]		
Plant:		
Land, including improvements, etc., 300 acres, at $55 an acre		$16,500
House furniture, etc		1,000
Live stock—		
2 horses, at $100	$200	
8 cows and heifers, at $25	200	
8 hogs, at $4	32	
		432
Machinery and tools—		
Farm wagon	50	
Buggy	50	
Harness, etc	30	
Drill and plows	85	
Harrow	18	
Forks	2	
		235
Materials and supplies:		
Feed and salable products on hand—		
Hay for stock, 30 tons, at $5	150	
Grain for stock, 70 barrels corn, at $2	140	
		290
Live stock—		
2 colts, at $60	120	
27 head stock cattle, at $30	810	
		930
Growing wheat, 80 acres		320
		19,707
LIABILITIES.		
Debt on 300-acre farm	8,459	
Debt for fertilizer and drill	220	
		8,679
Present worth of farm and equipment		11,028

[a] The classification of items in these inventories was made by the writer and is intended to show approximately the amount of capital invested in land and equipment and the value of farm products on hand. The part of material and supplies needed for the plant equipment is necessarily indefinite. It is therefore regarded as more desirable to include the value of such items under "Materials and supplies."

TABLE II.—*Inventory of the farm, January 1, 1905.*

Item.	Value.	Total.
ASSETS.		
Plant:		
Land, including buildings, etc., 380 acres at $75 an acre		$28,500
House furniture, etc		1,500
Live stock—		
7 horses	$550	
7 cows	280	
1 bull	60	
4 brood sows	40	
87 sheep	435	
		1,365
Machinery and tools—		
Farm machinery and implements	400	
Hand tools	100	
Carriages and wagons	400	
Harness	100	
		1,000
Materials and supplies:		
Feed and salable products on hand—		
30 tons of hay	240	
250 barrels of corn	562	
Bacon, flour, and potatoes	150	
Fodder and straw	100	
Oats and flaxseed meal	60	
		1,112
Live stock—		
4 heifers	100	
7 yearlings	140	
3 calves	30	
37 head feeding cattle	1,245	
23 shoats	75	
2 colts	100	
		1,690
Growing wheat, 92 acres		555
		35,722
LIABILITIES.		
Due on farm		8,500
Present worth of farm and equipment		27,222

TABLE III.—*Inventory of the farm, January 1, 1909.*

Item.	Value.	Total.
ASSETS.		
Plant:		
Land, including buildings, etc., 380 acres, at $95 an acre		$36,100
House furniture, etc		1,500
Live stock—		
6 work horses, 3 driving horses	$1,350	
17 cows, at $50	850	
1 bull	50	
3 brood sows	60	
1 boar	12	
100 sheep	700	
		3,022
Machinery and tools—		
Farm machinery and implements	600	
Hand tools	150	
Wagon and carriages	400	
Harness	200	
		1,350
Materials and supplies:		
Feed and salable products on hand—		
100 barrels of corn	300	
70 tons of hay	560	
Bacon, flour, and foodstuffs on hand	150	
Oats	20	
Fodder and straw	100	
		1,130
Live stock—		
2 colts	120	
18 fat cattle	1,260	
15 heifers and calves	375	
34 hogs	170	
		1,925
Growing wheat, 98 acres		585
Total resources		45,612
LIABILITIES.		
Due on farm		6,503
Present worth of farm and equipment		39,109

RECEIPTS AND EXPENDITURES.

The items in Table IV are taken from the books kept on the farm. This record includes five years—from 1904 to 1909. Some of the items in this table are estimates: for instance, grain and hay fed to stock. The amount of such materials produced on the farm is known quite accurately, however. The amount sold plus the amount on hand subtracted from the amount produced gives the amount of such products fed. The records are, of course, far from complete, yet the net income is shown with a fair degree of accuracy.

TABLE IV.—*Receipts and expenditures on the farm, 1904 to 1909, inclusive.*

Item.	1904.	1905.	1906.	1907.	1908.	1909.
RECEIPTS.						
Cattle, including fat cattle sold	$1,381.87	$2,684.39	$200.00	$500.00	$1,937.00	$700.00
Sheep, lambs, and wool	400.00	400.00	500.00	550.00	550.00	750.00
Wheat	1,480.30	1,230.00	751.00	1,557.00	1,157.00	1,682.00
Corn	765.00	969.50	600.00	1,000.00	750.00	900.00
Oats	112.00	.....	.....	.....	60.00	75.00
Hay	490.00	.....	700.00	800.00	900.00	960.00
Pork products	72.00	.....	.....	.....	.....	.....
Live hogs	50.00	135.00	300.00	200.00	475.00	750.00
Poultry, dairy, and garden products	350.00	375.00	400.00	400.00	600.00	600.00
Wood	180.00	.....	.....	.....	.....	.....
Apples	.....	500.00	.....	1,427.00	512.00	1,680.00
Total receipts	5,281.17	6,293.89	3,451.00	6,434.00	6,941.00	8,097.00
EXPENDITURES.						
Labor[a]	500.00	400.00	450.00	500.00	700.00	700.00
Taxes	170.00	150.00	138.00	145.00	140.00	168.00
Farm supplies	250.00	300.00	300.00	300.00	200.00	400.00
Interest on debt	360.00	360.00	360.00	344.00	260.00	240.00
Fertilizer	150.00	135.00	116.50	147.86	185.39	185.39
Seed	211.00	212.00	150.00	150.00	197.50	188.00
Grain and hay for stock (produced on farm and fed)	500.00	550.00	400.00	600.00	750.00	600.00
Cattle bought for feeding	650.00	1,763.00	.....	.....	781.24	.....
Hogs for feeding	.....	36.00	.....	.....	.....	.....
Extra labor picking apples, etc.	.....	.....	.....	300.00	.....	418.00
Total expenditure	2,791.00	3,906.00	1,914.50	2,486.86	3,214.13	2,899.39
Net income[b]	2,490.17	2,387.89	1,536.50	3,947.14	3,726.87	5,197.61

[a] The labor of the family is not counted as an item of expense.
[b] Net income, as understood on this farm, includes interest on investment, profits, and reward for the labor of the family.

The accompanying diagram (fig. 6) shows the net income during the period from 1892 to 1909. It also shows the gross value of wheat and corn produced during these years. The low income in the year 1906 is largely accounted for by the severe illness of the father during this year. The advance in the income the next year, 1907, was due to more than average yields of all kinds of crops, but there began to come in a new crop—apples—the gross sales of which amounted in 1907 to $1,427. This crop is now the most profitable on the farm. During the year 1909 the sales of apples amounted to $1,680.

CORN AND WHEAT.

Tables V and VI relate to corn and wheat production. The average yield of wheat during these years was 18 bushels an acre; that of corn nearly 40 bushels (eight barrels) an acre. These were fair yields, somewhat above the average for this region. The average cost per acre of raising wheat, as given in this table, is $6 an acre. In this estimate the rent of land and the cost of superintendence are

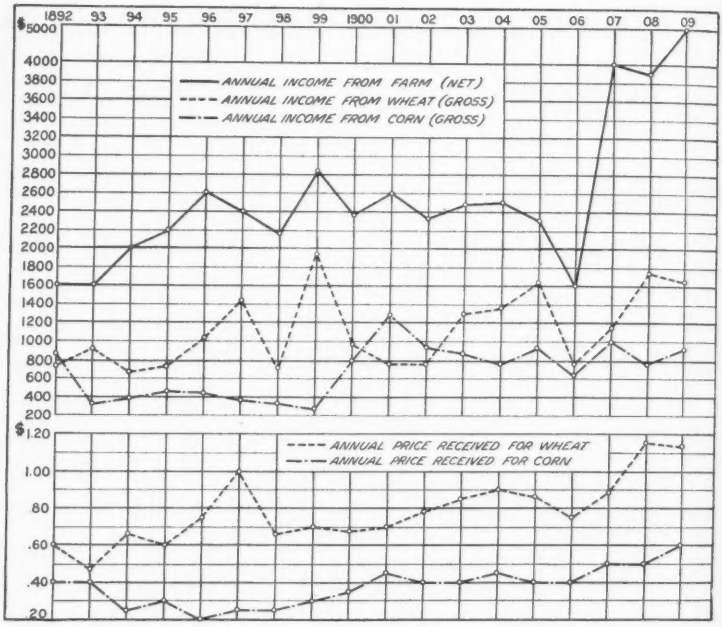

FIG. 6.—Diagram showing the annual net income from the farm and the annual gross income from wheat and corn.

not included. It is believed that these figures fairly represent the cost of raising wheat in this region.

The tables show no record of the cost of raising corn. The owner estimates, however, that it costs more to raise corn than wheat.

Hay on this farm is handled by modern machinery. It has produced on the average about 1¼ tons per acre.

TABLE V.—*Yield and cost of wheat crop, 1892 to 1908, inclusive.*

Year.	Area.	Yield per acre.	Cost of fertilizer per acre.	Total cost per acre.[a]	Total cost per bushel.	Selling price per bushel.	Profit per acre.
	Acres.	*Bushels.*					
1892	63	21	$2.70	$7.56	$0.36	$0.60	$5.04
1893	73	26¾	2.12	5.78	.22	.47	6.64
1894	55	19	1.20	4.69	.24	.66	7.85
1895	68	18	.90	4.65	.25	.60	6.15
1896	55	25	1.12	4.30	.17	.75	14.10
1897	64	22	1.35	5.95	.27	1.00	16.05
1898	70½	15	1.64	6.32	.42	.66	3.58
1899	112	23½	1.41	6.41	.27	.70	9.92
1900	82	17	1.25	6.04	.35	.68	5.52
1901	90	12½	1.70	6.71	.53	.70	2.05
1902	100	10	1.17	6.30	.63	.78	1.50
1903	100	15	.98	4.80	.32	.85	7.95
1904	91	17	1.17	6.84	.40	.80	6.76
1905	87½	20	1.55	6.96	.34	.86	10.34
1906	77½	13	2.38	7.40	.57	.74	2.21
1907	78	16	1.35	6.92	.43	.89	7.32
1908	95	16	2.00	5.47	.34	1.15	12.93

[a] The cost of labor, seed, and fertilizer is included in the estimated cost for each year, the labor being estimated on the basis of what it would cost to hire the work done at the market price.

TABLE VI.—*Yield of corn and price per barrel of crop, 1892 to 1908, inclusive.*

Year.	Area.	Total yield.	Yield per acre.[a]	Price per barrel.
	Acres.	*Barrels.*	*Barrels.*	
1892	44	440	10.0	$2.00
1893	55	169	3.1	2.00
1894	45	291	6.5	1.25
1895	50	293	5.9	1.50
1896	55	445	8.1	1.00
1897	40	306	7.6	1.25
1898	40	251	6.3	1.25
1899	30	187	6.2	1.50
1900	60	438	7.3	1.75
1901	55	545	9.9	2.25
1902	58	488	8.4	2.00
1903	60	450	7.5	2.00
1904	38	340	9.0	2.25
1905	42	491	11.7	2.00
1906	40	320	8.0	2.00
1907	44	397	9.0	2.50
1908	44	300	6.8	2.50

WHAT THE FARM HAS BEEN MADE TO ACCOMPLISH FOR THE FAMILY.

An attempt has been made thus far in the record given to set forth the actual operations of the farm. They are not set forth as models. On the whole, however, they represent good farm practice.

To just what degree this family has been successful depends upon the point of view taken. The financial record might seem to some disappointing, considering the amount invested and the number of people taking part in the labor producing these results. In terms of dollars and cents it might not be considered a paying business. On the other hand, if we consider the results produced through the

use made of the net income, the farm tells a different and a more satisfactory story. As was stated in the introduction, the intention in going on the farm was not primarily to increase the income, nor were money profits more than a secondary consideration. In the first place, the father was ill and was told by his physician that he could not live another year in the city if he continued his business. Some of the children were very young, while others were ready to enter the university. In order to measure success from the standpoint of the father and the mother we must know about the family and what it has accomplished and is doing.

The boys have graduated from a State university and the girls have been educated by private tutors and in girls' schools. At the present time two sons are lawyers, one a minister, one a professor, one a civil engineer, and one a farmer. The education of the children has cost the farm about $10,000. During the time the children were being educated there was no income except from the farm. At the present time these sons and daughters are profitably employed in honorable and useful occupations. While but three remain on the farm, one son and two daughters, all are following their present callings with the end in view of buying farms on which to make their homes.

Each year all members of the family, including grandchildren, spend their vacations on the farm. This is usually in harvest and haying time, so that no extra labor is hired during these farm operations.

The father declares that he has improved in health every year since coming on the farm. Now 76 years of age, he superintends all farm operations and knows the details of everything that is going on. He still enjoys good health and is fairly strong, being able to walk to every part of the farm. It must be remembered that he came on the farm long after most farmers begin to think of retiring, being then 60 years of age.

The farm work is not regarded as drudgery, and there is an atmosphere of refinement about the home that indicates a wholesome life on the part of the family. Everyone on the farm is occupied with some kind of work, and the farm operations go on in a businesslike manner, but no one is rushed or overworked. The mother is well preserved and vigorous, with no trace of overwork, though she has always been active in the management of the home and farm. She believes that the farm life, on the whole, has been easier for her and more enjoyable than the life in the city. Every member of the family is in love with farm life and expects to live on a farm when conditions permit.

SOCIAL AND AGRICULTURAL PROBLEMS SATISFACTORILY SOLVED.

(1) A professional man, with no previous experience as a farmer, with a large and expensive family, is able to rear and educate his children on the income of a well-located farm of 380 acres of good land with a modernized dwelling upon it (fig. 7). On a salary of $3,000 in the city the same amount of money could not have been expended on their education and a fair standard of living maintained. This fact is indicated in the inventory of 1892, which showed the present worth of the family to be $11,028, about $5,000 of which represented the savings of 22 years, the remainder being inherited. The present worth of the family, as represented by the farm in 1909, is $37,662. About $15,000 of this increase in present worth is due

FIG. 7.—The family home, built for comfort and economy of labor in household work.

to increase in land values. This leaves nearly $12,000 to represent savings during the period when the children were receiving their education.

Business training and experience have been important factors in the success achieved. The father, who, at the age of 76, still keeps in touch with all the farming operations, says: "My life as a soldier taught me how to obey and command, how to economize and endure. My life in the city as a lawyer in charge of a title and trust company taught me system and business methods, all of which were valuable to me on the farm."

A fact of special importance in this record is that these results were accomplished by following the established methods of farming. The yields are a little above the average for the community, because of more thorough tillage methods, but no extraordinary yields are recorded. The diary kept by the farmer and the history as written show keenness and foresight in adjusting crop and stock products to market conditions. The management of farm operations, although adjusted to the comfort and tastes of the family, have been conducted strictly on economic principles. From this standpoint a problem of great interest and importance has been worked out on this farm.

(2) The members of the family believe they have had more opportunities in the way of general culture gained by travel, etc., than would have been possible for them in the city. Socially they think there has been no essential loss; in fact, it is quite probable that the farm life has given better opportunities for culture of the most wholesome kind than the city would have afforded.

(3) The labor problem has been satisfactorily solved on this farm. With such wages as the farm could pay, the laborers have been able to accumulate sufficient property in a few years to take up farming for themselves. At the same time the women of the family have been relieved of extra work and responsibility necessarily attending the boarding and lodging of laborers; also the family life has been more homelike. The service secured in this way has been good, and on the whole the relations between employer and employed have been remarkably satisfactory.

(4) It has been found practicable and beneficial to train the children through occupations which require them to assume responsibility. As an inducement to make the chosen line interesting and as an incentive to industry, the profits of the industries on the farm went to the children managing these departments. It is the testimony of all who know the family that the children are all efficient managers.

(5) It has been demonstrated on this farm that an acre of garden, without any particular specialization in crop methods, can be made to pay the expenses of the table for a large family.

(6) The value of agricultural literature to the farmer is clearly demonstrated on this farm. Asked what benefit such literature had been to him, the father replied: "I would have been blind without it." The knowledge of spraying for San Jose scale saved a valuable orchard which is to-day the most profitable part of the farm. Fifteen or twenty well-chosen works on farming, with selected bulletins from State experiment stations and from the United States Department of Agriculture, constitute an important part of the farm library. Several standard agricultural papers are also taken.

A SERIOUS PROBLEM.

Since 1905 there has been a marked increase in the income of this farm, due principally to the apple crop. About the same time a sharp advance took place in the price of field crops and of live stock, and these prices have advanced since. As a result of these conditions the net income for 1909 was $5,197.50, the largest in the history of the farm. That the advance in income is not due, however, to increased productivity of the soil is disclosed by the records of the farm. An examination of Tables V and VI shows that wheat has decreased in yield per acre to a marked extent during the last half of the seventeen years. The average yield of this crop during the first half of this period was 21 bushels, and during the last half 15 bushels per acre. Corn, however, made an average of 35 bushels per acre during the first period of eight years and 43.5 bushels during the last nine years. On the other hand, clover and timothy have about held their own in yield during the entire period, the average being about 1¼ tons per acre. The increase in the yield of corn may be accounted for largely by an important change in the method of tillage. The proprietor of the farm now gives corn shallow cultivation during the last two times, whereas formerly he followed the usual custom of cultivating deep at all times and "hilling up" the corn at the last cultivation. This method of cultivation, together with an increase in the depth of plowing, which is now 9 to 10 inches, has greatly increased the yield of corn. It is to be noted also that a small quantity of lime, 300 to 400 pounds per acre, was put on the land at intervals with beneficial results to clover and thus indirectly to corn.

A statement in a letter lately received from this farmer shows that the soil has been held up to a normal standard of productivity with great difficulty and is in danger of decline. He says: "We are not getting the results for our labor and land that we should. I think we must work out a rotation that will give us larger yields of wheat. This I think can be accomplished by getting rid of the sorrel in our land and growing more clover and other leguminous crops. The wheat crop is the measure of all other values as a rule, and if we can grow more and cheaper wheat it will do more to reduce the cost of living than almost anything else."

This farm has a very good financial record, due to intelligence and the application of business methods in management. But one of the essential factors in the management of a farm is maintaining or strengthening those soil conditions which are favorable to the production of such value-producing crops as it seems desirable to raise.

If such conditions are not maintained certain weed pests, which find the soil favorable, come in and take the place of cultivated crops.

The farmer is often misled by this fact and regards the presence of weeds as the direct agent preventing the vigorous growth of crops, whereas the real cause may be the lack of a proper environment for the crops. For this reason attempts are often made to subdue weeds by cultivation alone, which is only partially successful and adds unnecessary expense.

The fact that sorrel is a persistent and troublesome weed on this farm is evidence that fundamental conditions of soil are defective and that other methods besides cultivation must be planned to subdue it and allow the desirable crops to take its place.

It is suggested, therefore, that a rotation of crops and some system of cultivating the soil be adopted which will build up and maintain the land in a condition which will better enable the cultivated crops to combat the weed enemy in the struggle to possess the soil.

The practice of liming the soil is found to be beneficial in this region, stimulating the growth of clover and thus tending to eliminate the sorrel. On this farm lime could be applied at little expense, since in many places limestone rock crops out at the surface. This rock could be blasted out and either ground or burned to be scattered on the land. This could be done at shorter intervals than formerly or a heavier application made of 1,000 or 2,000 pounds to the acre.

Besides the use of lime and commercial fertilizer the following rotations are suggested, the practice of which would speedily supply humus and nitrogen, materials which are essential in maintaining the soil in a condition favorable to field crops:

Corn plus crimson clover or rye and hairy vetch.
Cowpeas.
Wheat.
Hay (6 pounds of clover seed the following spring).
Pasture.

Crimson clover has not generally proved successful here and should be tested on a small area before sowing a large quantity. Three conditions at least are essential for a satisfactory growth of crimson clover. The soil must be inoculated with the proper bacteria, it must contain a fair amount of humus and nitrogen, and the seed must be sown sufficiently early in order to make a vigorous growth before winter.

Rye and hairy vetch are adapted to more general conditions, may be sown later than crimson clover, and will grow under conditions that will not produce crimson clover. It is essential that the land be artificially inoculated for hairy vetch unless the bacteria are known to be in the soil. The 6 pounds of clover seed to be sown the spring following the hay crop are essential in getting a stand of clover to plow under the next year for corn.

Alfalfa may be grown successfully on clean and fertile land in this region. When these conditions can be met the following rotation is advised:

Corn plus crimson clover or rye and hairy vetch.
Cowpeas.
Wheat.
Alfalfa.
Alfalfa.
Alfalfa.

On land that is fairly rich in nitrogen and humus, if the problem were simply to maintain fertility, a shorter rotation could be adopted by cutting out one year of wheat on this farm, making it a four-year rotation, which would have the effect of growing more legumes. It has been demonstrated that such a rotation as this would gradually increase the nitrogen and humus content of the soil. Minnesota Agricultural Experiment Station Bulletin No. 109 gives the results of experiments carried on in several places through a series of 10 years with a rotation of corn, wheat, hay, and pasture, and it was found that the humus and nitrogen could not only be maintained but increased.

One or the other of the two rotations first suggested will no doubt be adopted on this farm, at least until the land is built up to a normal standard.

FARM IMPLEMENTS AND THEIR COST.

The following is a complete list of the machinery and implements used on the farm described and their cost:

List of farm implements and their cost.

1 seven-foot-cut wheat binder	$135
1 six-foot-cut wheat binder—old—for use in case the other gets out of repair	100
1 five-foot mower	35
1 four-foot mower	30
1 manure spreader	80
1 ten-spout wheat hoe drill	75
1 eight-spout wheat disk drill	60
2 disk harrows (one tongueless)	50
2 spring-tooth harrows	27
2 spike-tooth harrows	24
2 two-horse chilled plows	12
2 three-horse chilled plows	18
2 walking wheeled double cultivators	50
4 double-shovel plows	10
1 double smoothing harrow	12
1 two-row disk corn planter	40
1 single-row corn planter	12

1 iron roller	$12
1 plank drag	2
1 hay loader	60
1 side-delivery horserake	40
2 single-horse cultivators	14
2 four-horse wagons	120
1 two-horse wagon	50
2 road beds for wagons	40
2 hayracks	20
1 steel spring-tooth hayrake (10 feet)	20
1 spring-tooth weeder	9
	1, 157

432

FARMERS' BULLETINS.

Bulletins in this list will be sent free, so long as the supply lasts, to any resident of the United States, on application to his **Senator, Representative, or Delegate in Congress,** or to the Secretary of Agriculture, Washington, D. C. *Because of the limited supply, applicants are urged to select only a few numbers, choosing those which are of special interest to them.* Residents of foreign countries should apply to the Superintendent of Documents, Government Printing Office, Washington, D. C., who has these bulletins for sale. Price 5 cents each to Canada, Cuba, and Mexico; 6 cents to other foreign countries. The bulletins entitled "Experiment Station Work" give briefly the results of experiments performed by the State experiment stations.

22. The Feeding of Farm Animals.
27. Flax for Seed and Fiber.
28. Weeds: And How to Kill Them.
30. Grape Diseases on the Pacific Coast.
32. Silos and Silage.
34. Meats: Composition and Cooking.
35. Potato Culture.
36. Cotton Seed and Its Products.
44. Commercial Fertilizers.
48. The Manuring of Cotton.
49. Sheep Feeding.
51. Standard Varieties of Chickens.
52. The Sugar Beet.
54. Some Common Birds.
55. The Dairy Herd.
56. Experiment Station Work—I.
60. Methods of Curing Tobacco.
61. Asparagus Culture.
62. Marketing Farm Produce.
64. Ducks and Geese.
65. Experiment Station Work—II.
69. Experiment Station Work—III.
73. Experiment Station Work—IV.
77. The Liming of Soils.
78. Experiment Station Work—V.
79. Experiment Station Work—VI.
81. Corn Culture in the South.
82. The Culture of Tobacco.
83. Tobacco Soils.
84. Experiment Station Work—VII.
85. Fish as Food.
86. Thirty Poisonous Plants.
87. Experiment Station Work—VIII.
88. Alkali Lands.
91. Potato Diseases and Treatment.
92. Experiment Station Work—IX.
93. Sugar as Food.
96. Raising Sheep for Mutton.
97. Experiment Station Work—X.
99. Insect Enemies of Shade Trees.
101. Millets.
103. Experiment Station Work—XI.
104. Notes on Frost.
105. Experiment Station Work—XII.
106. Breeds of Dairy Cattle.
113. The Apple and How to Grow It.
114. Experiment Station Work—XIV.
118. Grape Growing in the South.
119. Experiment Station Work—XV.
120. Insects Affecting Tobacco.
121. Beans, Peas, and Other Legumes as Food.
122. Experiment Station Work—XVI.
126. Practical Suggestions for Farm Buildings.
127. Important Insecticides.
128. Eggs and Their Uses as Food.
131. Household Tests for Detection of Oleomargarine and Renovated Butter.
133. Experiment Station Work—XVIII.
134. Tree Planting on Rural School Grounds.
135. Sorghum Sirup Manufacture.
137. The Angora Goat.
138. Irrigation in Field and Garden.
139. Emmer: A Grain for the Semiarid Regions.
140. Pineapple Growing.
142. Nutrition and Nutritive Value of Food.
144. Experiment Station Work—XIX.
145. Carbon Bisulphid as an Insecticide.
149 Experiment Station Work—XX.
150. Clearing New Land.
152. Scabies of Cattle.
154. Home Fruit Garden: Preparation and Care.
155. How Insects Affect Health in Rural Districts.
156. The Home Vineyard.
157. The Propagation of Plants.
158. How to Build Small Irrigation Ditches.
162. Experiment Station Work—XXI.
164. Rape as a Forage Crop.
166. Cheese Making on the Farm.
167. Cassava.
169. Experiment Station Work—XXII.
170. Principles of Horse Feeding.
172. Scale Insects and Mites on Citrus Trees.
173. Primer of Forestry. Part I: The Forest.
174. Broom Corn.
175. Home Manufacture and Use of Unfermented Grape Juice.
176. Cranberry Culture.
177. Squab Raising.
178. Insects Injurious in Cranberry Culture.
179. Horseshoeing.
181. Pruning.
182. Poultry as Food.
183. Meat on the Farm: Butchering, Curing, etc.
185. Beautifying the Home Grounds.
186. Experiment Station Work—XXIII.
187. Drainage of Farm Lands.
188. Weeds Used in Medicine.
190 Experiment Station Work—XXIV.
192. Barnyard Manure.
193. Experiment Station Work—XXV.
194. Alfalfa Seed.
195. Annual Flowering Plants.
196. Usefulness of the American Toad.
197. Importation of Game Birds and Eggs for Propagation.
198. Strawberries.
200. Turkeys.
201. Cream Separator on Western Farms.
202. Experiment Station Work—XXVI.
203. Canned Fruits, Preserves, and Jellies.
204. The Cultivation of Mushrooms.
205. Pig Management.
206. Milk Fever and Its Treatment.
209. Controlling the Boll Weevil in Cotton Seed and at Ginneries.
210. Experiment Station Work—XXVII.
213. Raspberries.
218. The School Garden.
219. Lessons from the Grain Rust Epidemic of 1904.
220. Tomatoes.
221. Fungous Diseases of the Cranberry.
222. Experiment Station Work—XXVIII.
223. Miscellaneous Cotton Insects in Texas.
224. Canadian Field Peas.
225. Experiment Station Work—XXIX.
227. Experiment Station Work—XXX.
228. Forest Planting and Farm Management.
229. The Production of Good Seed Corn.
231. Spraying for Cucumber and Melon Diseases.
232. Okra: Its Culture and Uses.
233. Experiment Station Work—XXXI.
234. The Guinea Fowl.
235. Preparation of Cement Concrete.
236. Incubation and Incubators.
237. Experiment Station Work—XXXII.
238. Citrus Fruit Growing in the Gulf States.
239. The Corrosion of Fence Wire.
241. Butter Making on the Farm.
242. An Example of Model Farming.
243. Fungicides and Their Use in Preventing Diseases of Fruits.
244. Experiment Station Work—XXXIII.
245. Renovation of Worn-out Soils.
246. Saccharine Sorghums for Forage.
248. The Lawn.
249. Cereal Breakfast Foods.
250. The Prevention of Stinking Smut of Wheat and Loose Smut of Oats.
251. Experiment Station Work—XXXIV
252. Maple Sugar and Sirup.
253. The Germination of Seed Corn.
254. Cucumbers.
255. The Home Vegetable Garden.
256. Preparation of Vegetables for the Table.
257. Soil Fertility.
258. Texas or Tick Fever and Its Prevention.
259. Experiment Station Work—XXXV.
260. Seed of Red Clover and Its Impurities.

262. Experiment Station Work—XXXVI.
263. Practical Information for Beginners in Irrigation.
264. The Brown-tail Moth and How to Control It.
266. Management of Soils to Conserve Moisture.
267. Experiment Station Work—XXXVII.
269. Industrial Alcohol: Uses and Statistics.
270. Modern Conveniences for the Farm Home.
271. Forage Crop Practices in Western Oregon and Western Washington.
272. A Successful Hog and Seed-corn Farm.
273. Experiment Station Work—XXXVIII.
274. Flax Culture.
275. The Gipsy Moth and How to Control It.
276. Experiment Station Work—XXXIX.
277. Alcohol and Gasoline in Farm Engines.
278. Leguminous Crops for Green Manuring.
279. A Method of Eradicating Johnson Grass.
280. A Profitable Tenant Dairy Farm.
281. Experiment Station Work—XL.
282. Celery.
283. Spraying for Apple Diseases and the Codling Moth in the Ozarks.
284. Insect and Fungous Enemies of the Grape East of the Rocky Mountains.
286. Comparative Value of Whole Cotton Seed and Cotton-seed Meal in Fertilizing Cotton.
287. Poultry Management.
288. Nonsaccharine Sorghums.
289. Beans.
290. The Cotton Bollworm.
291. Evaporation of Apples.
292. Cost of Filling Silos.
293. Use of Fruit as Food.
294. Farm Practice in Columbia Basin Uplands.
295. Potatoes and Other Root Crops as Food.
296. Experiment Station Work—XLI.
298. Food Value of Corn and Corn Products.
299. Diversified Farming Under the Plantation System.
301. Home-grown Tea.
302. Sea Island Cotton: Its Culture, Improvement, and Diseases.
303. Corn Harvesting Machinery.
304. Growing and Curing Hops.
305. Experiment Station Work—XLII.
306. Dodder in Relation to Farm Seeds.
307. Roselle: Its Culture and Uses.
309. Experiment Station Work—XLIII.
310. A Successful Alabama Diversification Farm.
311. Sand-clay and Burnt-clay Roads.
312. A Successful Southern Hay Farm.
313. Harvesting and Storing Corn.
314. A Method of Breeding Early Cotton to Escape Boll-weevil Damage.
316. Experiment Station Work—XLIV.
317. Experiment Station Work—XLV.
318. Cowpeas.
320. Experiment Station Work—XLVI.
321. The Use of the Split-log Drag on Earth Roads.
322. Milo as a Dry-land Grain Crop.
323. Clover Farming on the Sandy Jack-pine Lands of the North.
324. Sweet Potatoes.
325. Small Farms in the Corn Belt.
326. Building Up a Run-down Cotton Plantation.
328. Silver Fox Farming.
329. Experiment Station Work—XLVII.
330. Deer Farming in the United States.
331. Forage Crops for Hogs in Kansas and Oklahoma.
332. Nuts and Their Uses as Food.
333. Cotton Wilt.
334. Experiment Station Work—XLVIII.
335. Harmful and Beneficial Mammals of the Arid Interior.
337. Cropping Systems for New England Dairy Farms.
338. Macadam Roads.
339. Alfalfa.
341. The Basket Willow.
342. Experiment Station Work—XLIX.
343. The Cultivation of Tobacco in Kentucky and Tennessee.
344. The Boll Weevil Problem, with Special Reference to Means of Reducing Damage.
345. Some Common Disinfectants.
346. The Computation of Rations for Farm Animals by the Use of Energy Values.
347. The Repair of Farm Equipment.
348. Bacteria in Milk.
349. The Dairy Industry in the South.
350. The Dehorning of Cattle.
351. The Tuberculin Test of Cattle for Tuberculosis.
352. The Nevada Mouse Plague of 1907–8.
353. Experiment Station Work—L.
354. Onion Culture.
355. A Successful Poultry and Dairy Farm.
357. Methods of Poultry Management at the Maine Agricultural Experiment Station.
358. A Primer of Forestry. Part II: Practical Forestry.
359. Canning Vegetables in the Home.
360. Experiment Station Work—LI.
361. Meadow Fescue: Its Culture and Uses.
362. Conditions Affecting the Value of Market Hay.
363. The Use of Milk as Food.
364. A Profitable Cotton Farm.
365. Farm Management in Northern Potato-growing Sections.
366. Experiment Station Work—LII.
367. Lightning and Lightning Conductors.
368. The Eradication of Bindweed, or Wild Morning-glory.
369. How to Destroy Rats.
370. Replanning a Farm for Profit.
371. Drainage of Irrigated Lands.
372. Soy Beans.
373. Irrigation of Alfalfa.
374. Experiment Station Work—LIII.
375. Care of Food in the Home.
377. Harmfulness of Headache Mixtures.
378. Methods of Exterminating Texas-fever Tick.
379. Hog Cholera.
380. The Loco-weed Disease.
381. Experiment Station Work—LIV.
382. The Adulteration of Forage-plant Seeds.
383. How to Destroy English Sparrows.
384. Experiment Station Work—LV.
385. Boys' and Girls' Agricultural Clubs.
386. Potato Culture on Irrigated Farms of the West.
387. The Preservative Treatment of Farm Timbers.
388. Experiment Station Work—LVI.
389. Bread and Bread Making.
390. Pheasant Raising in the United States.
391. Economical Use of Meat in the Home.
392. Irrigation of Sugar Beets.
393. Habit-forming Agents.
394. Windmills in Irrigation in Semiarid West.
395. Sixty-day and Kherson Oats.
396. The Muskrat.
397. Bees.
398. Farm Practice in the Use of Commercial Fertilizers in the South Atlantic States.
399. Irrigation of Grain.
400. A More Profitable Corn-planting Method.
401. Protection of Orchards in Northwest from Spring Frosts by Fires and Smudges.
402. Canada Bluegrass: Its Culture and Uses.
403. The Construction of Concrete Fence Posts.
404. Irrigation of Orchards.
405. Experiment Station Work—LVII.
406. Soil Conservation.
407. The Potato as a Truck Crop.
408. School Exercises in Plant Production.
409. School Lessons on Corn.
410. Potato Culls as a Source of Industrial Alcohol.
411. Feeding Hogs in the South.
412. Experiment Station Work—LVIII.
413. The Care of Milk and Its Use in the Home.
414. Corn Cultivation.
415. Seed Corn.
416. Cigar-leaf Tobacco in Pennsylvania.
417. Rice Culture.
418. Game Laws for 1910.
419. Experiment Station Work—LIX.
420. Oats: Distribution and Uses.
421. Control of Blowing Soils.
422. Demonstration Work on Southern Farms.
423. Forest Nurseries for Schools.
424. Oats: Growing the Crop.
425. Experiment Station Work—LX.
426. Canning Peaches on the Farm.
427. Barley Culture in the Southern States.
428. Testing Farm Seeds in the Home and in the Rural School.
429. Industrial Alcohol: Sources and Manufacture
430. Experiment Station Work—LXI.